

MORTALITY AND EMERGENCY ROOM VISITS AMONG PEOPLE LIVING CLOSE TO GEOTHERMAL SOURCES OF AIR POLLUTION

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Background and Aims: Subjects living in buildings located in volcanic areas may be exposed to H₂S and CO₂ emitted from the soil. Few studies have shown that geothermal emissions can cause fatalities from asphyxiation and increases in respiratory diseases. We studied the association between residence in a geothermal area and mortality and emergency room visits (ERVs) in Marino (Rome).

Methods: We enrolled the cohort of residents in Marino from 01/01/1996 to 31/12/2008. Each participant's address was geocoded and the mortality and ERVs follow-up was done using health databases. The cohort was divided in three zones, according to residence at baseline: the area close to the gas emission site (zone A), the surrounding area (zone B), and the rest of Marino (reference). We measured peaks of indoor CO₂ and H₂S up to 28% and >500 ppm in zone A and 11% and 54 ppm in zone B. We evaluated the risk of mortality and ERVs in zone A and B using a Poisson regression model adjusting for age and socio-economic status.

Results: 53,609 people were enrolled, 2.1% living in zone A and 5.4% in zone B. When we compared zone A with the reference, we found an increased risk of myocardial infarction mortality (RR 2.12, 95%CI 0.92-4.87) among men and increased number of ERVs both in men (RR 1.09, 95%CI 1.03-1.16) and in women (RR 1.15, 95% CI 1.08-1.22), in particular for intoxication (RR 2.70 95%CI 1.14-6.39) among men. In zone B, increased risks of ERV for dyspnoea (RR 1.50 95%CI 1.19-1.88 men; RR 1.41 95%CI 1.07-1.86 women) and chest pain (RR 1.42 95%CI 1.07-1.87 women) were found.

Conclusions: We found elevated mortality and ERVs rates consistent with high exposures to H₂S and CO₂. There is a need of epidemiological surveillance of populations living in high risk areas.